WHAT IS CLAIMED IS:

1. An electrode for use in the detection of an analyte by electrochemiluminescence comprising a composite containing a polymer matrix and a multiplicity of carbon particles dispersed therein, said electrode having a binding domain containing a reagent capable of binding a component of a binding electrochemiluminescence assay.

2. An electrode as recited in claim 1, wherein the carbon particles comprise from 0.5% to 50% by weight of the composite.

3. An electrode as recited in claim 1, wherein the carbon particles comprise from 1% to 30% by weight of the composite.

4. An electrode as recited in claim 1, wherein the carbon particles comprise from 2% to 20% by weight of the composite.

5. An electrode as recited in claim 1, wherein said composite is molded.

6. An electrode as recited in claim 1, wherein said composite is extruded.

7. An electrode as recited in claim 1, wherein said reagent is covalently bound to said electrode.

8. An electrode as recited in claim 1, wherein said reagent is non-covalently bound to said electrode.

9. An electrode as recited in claim 1, wherein said reagent is directly immobilized on said electrode.

10. An electrode as recited in claim 1, wherein said reagent is indirectly immobilized on said electrode via a binding pair.

11. An electrode as recited in claim 1, wherein said electrode includes a multiplicity of binding domains.

12. An electrode as recited in claim 1, wherein said binding reagent is an antibody or fragment thereof, a nucleic acid, a receptor or an enzyme.

13. An electrode as recited in claim 1, wherein said carbon particles are fibrils.

14. An electrode as recited in claim 1, wherein said electrochemiluminescence assay is a homogeneous assay.

15. A method for the manufacture of an electrode for use in the detection or quantitation of an analyte by electrochemiluminescence comprising the steps of:

(a) treating a composite containing a matrix and a multiplicity of carbon particles dispersed therein with a plasma, and

(b) forming a binding domain on the so-treated composite containing a reagent capable of binding a component of a binding electrochemiluminescence assay.

16. A method as recited in claim 15, wherein two or more sequential plasma treatments are conducted.

17. A method as recited in claim 15, wherein the plasma contains an atom or compound selected from the group consisting of O_2, Ar, H_2O, N_2, NH_3, CF_4, SF_6, C_2F_6, CHF_3, CF_2Cl_2, CF_3Br, CF_3Cl and combinations thereof.

18. A method as recited in claim 15, wherein said plasma treatment is for one or more of the purposes of: (a) etching said polymer, or (b) derivatizing the exposed surfaces of the carbon particles dispersed in said polymer.

19. A method as recited in claim 15, wherein said matrix is a polymer.

20. A method as recited in claim 15, wherein said carbon particles are fibrils.

21. A method as recited in claim 15, wherein said binding domain is formed by introducing said reagent through a hole in a mask placed on said composite.

22. A method for the manufacture of an electrode for use in the detection of an analyte by electrochemiluminescence comprising the steps of:

(a) treating a composite containing a matrix and a multiplicity of carbon particles dispersed therein with a chemical reagent, and

(b) forming a binding domain on the so-treated composite containing a reagent capable of binding a component of a binding electrochemiluminescence assay.

23. A method as recited in claim 22, wherein said matrix is a polymer.

24. A method as recited in claim 22, wherein said carbon particles are fibrils.

25. A method as recited in claim 22, wherein said chemical reagent is an oxidizing agent.

26. A method as recited in claim 22, wherein said binding domain is formed by introducing said reagent through a hole in a mask placed on said compsite.

27. An electrode for use in the detection of an analyte by electrochemiluminescence prepared by the method of claim 15.

28. An electrode for use in the detection of an analyte by electrochemiluminescence prepared by the method of claim 22.

29. A cartridge for use in an instrument system for conducting electrochemiluminescence assays for the detection or quantitation of an analyte, comprising: one or more electrodes each comprising a polymer matrix and a multiplicity of carbon particles dispersed therein, each of said one or more electrodes having one or a plurality of binding domains, each of said

domains containing a reagent capable of binding a component of a binding electrochemiluminescence assay.

30. A cartridge as recited in claim 29, which does not contain a liquid assay reagent.

31. A cartridge as recited in claim 29, containing in addition to said one or more electrodes, a dry assay reagent.

32. A cartridge as recited in claim 31, wherein said dry assay reagent is an electrochemiluminescence coreactant.

33. A cartridge as recited in claim 31, wherein said assay reagent is a buffer.

34. A cartridge as recited in claim 31, wherein said assay reagent contains an electrochemiluminescent moiety.

35. A cartridge as recited in claim 31, wherein said reagent is a calibration standard.

36. A cartridge as recited in claim 31, wherein said reagent is a preservative.

37. A cartridge as recited in claim 31, wherein said reagent is a carbohydrate.

38. A cartridge as recited in claim 29, wherein said electrode defines an interior wall of a cell for containing a liquid sample.

39. A cartridge as recited in claim 29, including a window for passage of light from said cartridge to means for detecting light from said assay.

40. A cartridge as recited in claim 29, including fluid metering means.

41. A cartridge as recited in claim 29, including means for modulating the temperature of said cartridge.

42. A cartridge as recited in claim 29, including means for determining the temperature of said cartridge.

43. A cartridge as recited in claim 29, including a fluid path.

44. A cartridge as recited in claim 29, including a counter electrode.

45. A cartridge as recited in claim 29, including a reference electrode.

46. A cartridge as recited in claim 29, including a source of electrical energy.

47. A cartridge as recited in claim 29, including means for containment of a fluid sample introduced to said cartridge.

48. A cartridge as recited in claim 29, which is injection molded.

49. A cartridge as recited in claim 29, which is disposable.

50. A cartridge as recited in claim 29, including means for mixing contents thereof.

51. A cartridge as recited in claim 50, wherein said means for mixing is a sonication device.

52. A cartridge as recited in claim 51, wherein said sonication device is a piezoelectric device structurally coupled to the electrode in said cartridge.

53. A cartridge as recited in claim 29, wherein said electrochemiluminescence assay is homogeneous.

54. An instrument system for conducting electrochemiluminescence assays for the detection or quantitation of an analyte comprising:

(a) a cartridge including one or more electrodes each comprising a composite containing a polymer matrix and a multiplicity of carbon particles dispersed therein, each of said one or more electrodes having one or a plurality of binding domains, each of said domains containing a reagent capable of binding a component of a binding electrochemiluminescence assay; and

(b) means for selectively detecting or quantitating light from each of said binding domains.

55. An instrument system as recited in claim 54, wherein said carbon particles are fibrils.

56. An instrument system as recited in claim 54, including means for mixing contents of said cartridge.

57. An instrument system as recited in claim 54, wherein said cartridge includes a dry assay reagent.

58. An instrument as recited in claim 54, wherein said means for detecting or quantitating light is a CCD.

59. An instrument as recited in claim 54, wherein said means for detecting or quantitating light is a photodiode.

60. An instrument as recited in claim 54, including temperature control means for controlling the temperature of said cartridge.

61. An instrument system for conducting electrochemiluminescence assays for the detection or quantitation of an analyte comprising:

(a) a cartridge including one or more electrodes each comprising a composite containing a matrix and a multiplicity of carbon fibrils dispersed therein, each of said one or more electrodes having one or a plurality of binding domains, each of said domains containing a reagent capable of binding a component of a binding electrochemiluminescence assay;

(b) means for selectively detecting or quantitating light from each of said binding domains; and

(c) means for mixing contents of said cartridge.

62. An instrument system as recited in claim 61, wherein said mixing system is a sonication device.

63. An instrument system for conducting electrochemiluminescence assays for the detection or quantitation of an analyte comprising:

(a) a cartridge including one or more electrodes each comprising a composite containing a matrix and a multiplicity of carbon particles dispersed therein, each of said one or more electrodes having one or a plurality of binding domains, each of said domains containing a reagent capable of binding a component of a binding electrochemiluminescence assay;

(b) means for applying a potential at one or more of said electrodes;

(c) means for selectively detecting or quantitating light from said binding domains;

(d) electronic means to coordinate the application of a potential at one or more of said electrodes with the operation of said means for detecting or quantitating light from said binding domains; and

(e) electronic means for storage or processing of information received form said light detecting or quantitation means.

64. An instrument system as recited in claim 63, including means for mixing contents of said cartridge.

65. An instrument system as recited in claim 63, wherein said cartridge includes a dry assay reagent.

66. An instrument system as recited in claim 63, wherein said carbon particles are fibrils.

67. An instrument system for conducting electrochemiluminescence assays for the detection or quantitation of an analyte, comprising:

(a) a cartridge including one or more electrodes each of said one or more electrodes having one or a plurality of binding domains, each of said domains containing a reagent capable of binding a component of a binding electrochemiluminescence assay;

(b) means for applying a potential at one or more of said electrodes;

(c) means for selectively detecting or quantitating light from said binding domains;

(d) electronic means to coordinate the application of a potential at one or more of said electrodes with the operation of said

means for detecting or quantitating light from said binding domains; and

(e) electronic means for storage or processing of information received form said light detecting or quantitation means.

68. An instrument system as recited in claim 67, including means for mixing the contents of said cartridge.

69. An instrument as recited in claim 67, including temperature control means for controlling the temperature of said cartridge.

70. An instrument system as recited in claim 67, wherein said cartridge includes a dry assay reagent.

71. An apparatus for use in the detection of an analyte comprising an electrode comprised of a composite of a matrix and a multiplicity of carbon fibrils dispersed therein and having a binding domain containing a reagent capable of binding a component of a binding assay.

72. An electrode for use in the detection of an analyte by electrochemiluminescence comprising a composite containing a matrix and a multiplicity of carbon fibrils dispersed therein, said electrode having a binding domain containing a reagent capable of binding a component of a binding electrochemiluminescence assay.

73. A solid phase support for immobilization of a biomolecule, comprising: a composite containing a matrix and a multiplicity of carbon fibrils dispersed therein.

74. A solid phase support as recited in claim 73, wherein said matrix is a polymer.

75. A solid phase support as recited in claim 73, wherein said support is used in the detection or quantitation of analyte.

76. A solid phase support as recited in claim 73, wherein an enzyme is immobilized on said support.

77. An electrode for use in the detection of an analyte by electrochemiluminescence comprising a matrix and a multiplicity of carbon fibrils dispersed therein, said electrode having a biomolecule immobilized thereupon.

78. A cartridge for use in an instrument system for conducting electrochemiluminescence assays for the detection or quantitation of an analyte, comprising: one or more electrodes each comprising a matrix and a multiplicity of carbon fibrils dispersed therein, each of said one or more electrodes having one or a plurality of binding domains, each of said domains containing a reagent capable of binding a component of a binding electrochemiluminescence assay.

79. A cartridge as recited in claim 71, containing in addition to said one or more electrodes, a dry assay reagent.

80. A method for conducting an electrochemiluminescence binding assay for detecting or measuring an analyte of interest in a sample comprising:

(a) contacting an assay electrode with a sample and a component of said assay linked to an electrochemiluminescent label, said assay electrode:

(i) comprising a composite containing a polymer matrix and a multiplicity of carbon particles dispersed therein; and

(ii) having a binding domain containing a binding reagent, wherein said binding reagent is immobilized on said electrode;

(b) applying a voltage waveform effective to trigger electrochemiluminescence at said binding domain in the presence of a reaction medium suitable for conducting an electrochemiluminescence assay; and

(c) detecting or measuring electrochemiluminescence from said binding domain;

wherein said detected or measured electrochemiluminescence correlates to the presence or amount of said analyte in said sample.

81. The method of claim 80, wherein the carbon particles comprise from 0.5% to 50% by weight of the composite.

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82. The method of claim 80, wherein the carbon particles comprise from 1% to 30% by weight of the composite.

83. The method of claim 80, wherein said binding reagent is covalently bound to said assay electrode.

84. The method of claim 80, wherein said binding reagent is non-covalently bound to said assay electrode.

85. The method of claim 80, wherein said binding reagent is directly immobilized on said assay electrode.

86. The method of claim 80, wherein said binding reagent is indirectly immobilized on said assay electrode via a binding pair.

87. The method of claim 80, wherein said assay electrode includes at least one additional binding domain.

88. The method of claim 80, wherein said binding reagent comprises an antibody or fragment thereof, a nucleic acid, a receptor or an enzyme.

89. The method of claim 80, wherein said electrode comprises one or more additional binding domains having different binding specificities to provide for simultaneous binding of a plurality of different analytes of interest present in said sample.

90. The method of claim 80, wherein said sample is a metered volume of sample.

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91. The method of claim 80, further including a wash step.

92. The method of claim 80, further including a calibration step.

93. The method of claim 80, wherein one component of the assay is stored in dry form and reconstituted by the sample.

94. The method of claim 80, wherein said voltage is applied to two of said electrodes at different times.

95. The method of claim 80, wherein said reaction medium includes an ECL coreactant.

96. The method of claim 80, wherein said electrochemiluminescent label is capable of repeatedly emitting electrochemiluminescence.

97. The method of claim 80, wherein said electrochemiluminescent label comprises a metal.

98. The method of claim 80, wherein said electrochemiluminescent label comprises an organometallic compound.

99. The method of claim 80, wherein said electrochemiluminescent label comprises an organometallic compound selected from the group consisting of Ru-containing and Os-containing organometallic compounds.

100. The method of claim 80, wherein, when said sample comprises said analyte, said contacting step results in the formation of a sandwich complex comprising said binding reagent,

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said analyte and said component.

101. The method of claim 80, wherein said analyte competes with said component for binding to said binding reagent.

102. The method of claim 80, wherein said analyte competes with said binding reagent for binding said component.

103. The method of claim 80, wherein said analyte binds to said binding reagent.

104. The method of claim 80, wherein said analyte binds said component.

105. The method of claim 80, wherein said analyte binds said binding reagent and said component.

106. A method for conducting electrochemiluminescence binding assays for detecting or measuring a plurality of analytes of interest in a sample comprising:

(a) contacting an assay electrode with a sample and one or more assay components linked to electrochemiluminescent labels, said assay electrode:

(i) comprising a composite containing a polymer matrix and a multiplicity of carbon particles dispersed therein; and

(ii) having a plurality of binding domains containing binding reagents, wherein said

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binding reagents are immobilized on said electrode;

(b) applying a voltage waveform effective to trigger electrochemiluminescence at said binding domains in the presence of a reaction medium suitable for conducting an electrochemiluminescence assay; and

(c) detecting or measuring electrochemiluminescence from said binding domains;

wherein said detected or measured electrochemiluminescence at said binding domains correlates to the presence or amount of said analytes in said sample.

107. The method of claim 106, wherein at least two of said binding domains comprise binding reagents that differ in specificity for analytes of interest.

108. The method of claim 106, wherein the measured electrochemiluminescence at a first of said binding domains correlates with the presence or amount of a first analyte and the measured electrochemiluminescence at a second of said binding domains correlates with the presence or amount of a second analyte.

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